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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,072	02/14/2002	Andreas Fischer	P0877	3504

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EXAMINER
LEE, WILSON

ART UNIT	PAPER NUMBER
2821	

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,072	FISCHER ET AL.	
	Examiner	Art Unit	
	Wilson Lee	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejection – 35 U.S.C. 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 recites the limitation "said powered electrode" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claims 14-17 are indefinite by virtue of their dependency on claim 13.

Claim Rejections – 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Mabuchi et al. (6,091,045).

Regarding Claim 1, Mabuchi discloses a plasma processing chamber (11) configured to receive a gas, comprising:

- a first powered electrode (15) configured to receive a work piece (LSI, LCD, etc.), said first powered electrode having a first electrode area (the top surface of the first electrode 15);
- a power generator (28) operatively coupled to said first powered electrode and configured to communicate power to said first powered electrode;

- a second electrode (14) disposed at a distance from said first powered electrode, said first powered electrode and said second electrode configured to convert said gas (from gas inlet 25) to a plasma, said second electrode have a second electrode area (the under part of the second electrode 14); and
- a ground extension (14b) adjacent said first powered electrode and surrounding said first powered electrode (See Figure 15).

Regarding Claim 2, Mabuchi discloses a confinement ring (14e) configured to confine said plasma, said at least one confinement ring surrounding said first powered electrode (15) (See Figure 17).

Regarding Claim 3, Mabuchi discloses that the ground extension further comprises a protrusion (14b) (See Col. 6, line 11 and Figure 15).

Regarding Claim 4, Mabuchi discloses that the ground extension surrounds said first power electrode (15) (See Figure 15).

Regarding Claim 5, Mabuchi discloses that the ground extension (14b) (ground terminal) is configured to drain charge (electron) from said plasma (See Figure 15).

Regarding Claim 6, Mabuchi discloses that the ground extension surrounds said first power electrode (15) (See Figure 15).

Regarding Claim 7, Mabuchi discloses that ground extension (14b) (ground terminal) is configured to drain charge (electron) from said plasma (See Figure 5).

Regarding Claim 8, Mabuchi discloses that the second electrode area (the under part of the second electrode 14) is greater than the first electrode area (the surface of

the first electrode 15) (See Figure 15). Therefore, the electrode area ratio is in fact greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 9, Mabuchi discloses that the second electrode (14) further comprises a notch (21a), said notch configured to increase said second electrode area (See Figure 9).

Regarding Claim 10, Mabuchi discloses that the ground extension (14b) surrounds said first power electrode (15) (See Figure 15).

Regarding Claim 11, Mabuchi discloses that ground extension (14b) (ground terminal) is configured to drain charge (electron) from said plasma (See Figure 5).

Regarding Claim 12, Mabuchi discloses that the second electrode area (the under part of the second electrode 14) is greater than the first electrode area (the top surface of the first electrode 15) (See Figure 15). Therefore, the electrode area ratio is in fact greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 13, Mabuchi discloses a plasma processing chamber configured to receive a gas (See Figures 15 and 17), comprising:

- a first powered electrode (15) configured to receive a work piece (LSI, LCD, etc.), said first powered electrode (15) having a first electrode area (the top surface of the first electrode 15);

- a power generator (28) operatively coupled to said first powered electrode (15) and configured to communicate power to said first powered electrode;
- a second electrode (14) disposed above said first powered electrode, said first powered electrode and said second electrode configured to convert said gas (from gas inlet 25) to a plasma;
- a ground extension (14b) adjacent said first powered electrode (15) and surrounding said first powered electrode, said ground extension separated from said first powered electrode by a dielectric (insulating members 16, 18); and
- at least one confinement ring (14e) configured to confine said plasma, said at least one confinement ring surrounding said first powered electrode (15).

Regarding Claim 14, Mabuchi discloses that ground extension (14b) (ground terminal) is configured to drain charge (electron) from said plasma (See Figure 5).

Regarding Claim 15, Mabuchi discloses that the second electrode area (the under part of the second electrode 14) is greater than the first electrode area (the top surface of the first electrode 15) (See Figure 15). Therefore, the electrode area ratio is in fact greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 16, Mabuchi discloses that the ground extension further comprises a protrusion (14b) (See Col. 6, line 11 and Figure 15).

Regarding Claim 17, Mabuchi discloses that the second electrode (14) further comprises a notch (21a), said notch configured to increase said second electrode area (See Figure 9).

Regarding Claim 18, Mabuchi discloses a method for generating a confined plasma in a plasma processing chamber comprising:

- receiving a gas (from gas inlet 25) in said plasma processing chamber (11);
- causing a first electrode (15) to receive a work piece (LSI, LCD, etc.), said first electrode operatively coupled to a power supply (28);
- causing a second electrode (14) disposed at a distance from said first electrode to receive RF power from said first electrode, said second electrode having a second electrode area that is greater than said first electrode area (See Figures 15 and 17);
- engaging a power supply (28) to communicate RF power to said first electrode to generate a plasma; and
- causing a ground extension (14b) adjacent said first electrode to drain a plurality of charge from said plasma.

Regarding Claim 19, Mabuchi discloses draining (e.g. grounding) said plurality of charge (electron) at a plasma boundary defined by at least one confinement ring (14e) (See Figure 15).

Claim R j ctions – 35 U.S.C. 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mabuchi et al. (6,091,045).

Mabuchi discloses the claimed invention except for the rate of the gas flow (up to 1500sccm) and the range (up to 2 W per cm^3 of plasma volume) of the RF power. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to render gas flow rate at any desired range (e.g. up to 1500sccm) and/or the power range at any desired range (e.g. up to 2 W per cm^3 of plasma volume) in order to attain the desired pressure, amount of plasma, heating temperature, or voltage charge depend on the characteristics of the particular work piece, since it is held that where the general conditions of the claims are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA 1955). In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Liu et al. (6,403,491) disclosds a etch method using a dielectric etch chamber with expand process window.

Corr spond nc

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Wilson Lee whose telephone number is (703) 306-3426.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0956.

Papers related to Technology Center 2800 applications may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The Technology Center Fax Center number is (703) 308-7722 or (703) 308-7724.

Patent Examiner
Art Unit 2821
U.S. Patent & Trademark Office

WL
11/26/02